

Release Notes on additional RESOLVE cases requested by parties, 10/12/2017

Background

On 8/24/2017, CPUC Energy Division staff announced to the IRP proceeding service list an offer to run a limited number of additional RESOLVE model cases, according to the process and [instructions](#) described on the [IRP Events and Materials](#) page under the heading “Modeling Requested by Parties.” On 9/26/2017, parties submitted their case run requests. Staff revised the list according to whether the requested cases were feasible and configurable from the RESOLVE User Interface Dashboard. On 10/12/2017, staff posted the [results](#). Some of the requested cases included input settings that were outside the range of what was rigorously tested for the 249 cases that were released as part of the [Proposed Reference System Plan RESOLVE modeling results package](#). Staff provides the following additional information about these input settings for consideration when reviewing the results of the additional RESOLVE model cases requested by parties.

Gas Retirement and CHP Retirement: “Retirement after 10 years”

Existing Resource Adequacy rules were not designed for a system with very little or no dispatchable generation. Resource Adequacy is maintained in California through procurement of resources sufficient to meet a 15-17% Planning Reserve Margin (PRM), under the assumption that capacity—the ability to produce energy on demand—is the most limiting factor in meeting long-term reliability needs. However, in a system that relies heavily on variable renewable resources and bulk electricity storage to meet Resource Adequacy needs, the interaction of weather-dependent energy production from renewable generation and the quantity and duration of energy storage becomes much more important. For example, a system may have sufficient renewable generation and energy storage capacity to meet load during most hours of the year, but may have insufficient storage duration to accommodate a multi-day event with low renewable generation and high loads. This type of system was not considered in developing the current PRM framework, and Resource Adequacy has not been studied rigorously for a system without dispatchable generation. RESOLVE relies on the existing PRM-based framework to ensure that each portfolio meets Resource Adequacy needs, by ensuring that the sum of effective capacity exceeds the PRM. However, it is not known if the portfolios developed under this framework provide acceptable reliability in the absence of dispatchable generation. Additional research and modeling capability is needed before a full gas retirement case can be assessed.

Coal Flexibility: “Must-Run”

Some requested cases that included a “Must-Run” flag for coal outside the CAISO produced extreme results due to the incurrence of penalty costs associated with overgeneration outside of CAISO. The Must-Run coal flag models coal resources as non-dispatchable, forcing the model to run coal plants at their installed capacity whenever possible. This option reduces inertia flexibility (CAISO doesn’t have coal resources), but the current implementation of this option can limit the model’s ability to balance load and supply outside of California where new resources cannot be added. Turning on the Must-Run coal flag can cause zones outside of CAISO to be in overgeneration conditions on a handful of days when

renewable curtailment is not allowed, which distorts cost signals and investments due to a very high, reliability-based penalty price on overgeneration. In RESOLVE results, this effect will appear as a very negative value for CAISO operating cost, which reflects the fact that that CAISO is “purchasing” energy from other regions (e.g. the Northwest) at the extreme negative penalty price for overgeneration.

Banking: “Optimize Banking”

As part of the process of adding functionality to RESOLVE for its use in IRP, E3 tested the addition of a feature that would allow the model to “optimize” the use of the RPS bank over the timeline of the horizon, but this feature was not utilized because of the unrealistic distortions it created in the portfolios. The Optimize Banking functionality in RESOLVE allows the model to build renewable resources in earlier investment periods, saving renewable energy certificates (RECs) for use in later periods. However, the optimization functionality for the bank did not produce satisfactory results due to unexpected interactions between the end-year of the modeling time horizon and renewable integration challenges. As a result, the modeling team decided to use a fixed bank redemption schedule instead.

Accuracy of post-2030 input data used when including simulation years post-2030

The analysis conducted in IRP has to date been focused on meeting 2030 goals; as such, the modeling team has focused attention on developing, reviewing, and validating assumptions in the User Interface through the 2030 period. Data after 2030 did not receive the same level of detailed review, and typically represents an extrapolation of pre-2030 trends; these extrapolations may or may not lead to reasonable results.